

PATENT
App. Ser. No.: 10/020,382
Atty. Dkt. No. ROC920010307US1
PS Ref. No.: IBMK/10307

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A method of sending data from a first computer to a second computer connected within a network, the first and second computers configured to send the data using a layered sequence of data communication protocols, the first computer having one or more data communication protocol layers that correspond to one or more data communication protocol layers in the second computer, the one or more protocol layers layered sequence of data communication protocols comprising at least a first protocol layer and a second protocol layer, the method comprising:

generating a first layer protocol data unit (PDU) by:

(a) attaching a first header to the data at the first protocol layer of the first computer; and

(b) reserving a space in the first header for an identifier;

~~(c)~~ sending the first layer PDU data and the first header from the first protocol layer to the second protocol layer of the first computer;

~~(d) repeating steps (a) — (b) for a second header;~~

generating a second layer PDU by:

(a) attaching a second header to the first layer PDU at the second protocol layer of the first computer;

(b) reserving a space in the second header for the identifier;

~~(c)~~ (c) generating the identifier at the second protocol layer; and

~~(f) (d) storing the identifier in the reserved space of the first header and~~
in the reserved space of the second header and sending a copy of the identifier to the first protocol layer;

~~(g) sending the data second layer PDU with the first header and the second header from the second protocol layer of the first computer to its corresponding second protocol layer of the second computer over the network;~~

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~~(h)~~ removing the second header from the second layer PDU data at the second protocol layer of the second computer;
~~(i)~~ copying the identifier from the reserved space in the second header to the reserved space in the first header;
~~(j)~~ sending the ~~data and the first header~~ first layer PDU from the second protocol layer of the second computer to the first protocol layer of the second computer; and
~~(k)~~ removing the first header from the ~~data~~ first layer PDU at the first protocol layer of the second computer.

2. (Canceled)

3. (Currently Amended) The method of claim 1, wherein the first protocol layer is the highest protocol layer of the layered sequence of data communication protocols.

4. (Currently Amended) The method of claim 1, wherein the second protocol layer is the lowest protocol layer of the layered sequence of data communication protocols.

5. (Canceled)

6. (Original) The method of claim 1, wherein the identifier is generated using a counter.

7. (Original) The method of claim 1, further comprising sending a code from the second protocol layer of the first computer to the first protocol layer of the first computer, the code indicating whether the data was successfully sent from the second protocol layer of the first computer to its corresponding second protocol layer of the second computer.

8. (Original) The method of claim 1, wherein the space reserved for the identifier is the first four bytes of each header.

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9. (Currently Amended) A method of sending data from a computer to a network through a layered sequence of one or more data communication protocol layers, the protocol layers comprising at least a first protocol layer and a second protocol layer, the method comprising:

generating a first layer protocol data unit (PDU) by:

(a) attaching a first header to the data at the first protocol layer; and

(b) reserving a space in the first header for an identifier;

~~(c) sending the first layer PDU data and the first header from the first protocol layer to the second protocol layer;~~

~~(d) repeating steps (a) — (b) for a second header;~~

generating a second layer PDU by:

(a) attaching a second header to the first layer PDU at the second protocol layer of the first computer;

(b) reserving a space in the second header for the identifier;

~~(c)~~ (c) generating the identifier at the second protocol layer; and

~~(f) (d) storing the identifier in the reserved space of the first header and in the reserved space of the second header and sending a copy of the identifier to the first protocol layer;~~

~~(g) sending the data second layer PDU with the first header and the second header from the second protocol layer to the network.~~

10. (Canceled)

11. (Currently Amended) A method of receiving data by a computer from a network, the computer having a layered sequence of one or more data communication protocol layers, the protocol layers comprising at least a first protocol layer and a second protocol layer, the method comprising:

(a) receiving from the network, at the second protocol layer, the data, a first header corresponding to the first protocol layer, and a second header corresponding to the second protocol layer;

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(b) removing, at the second protocol layer, the second header from the data, the second header having an identifier;

(c) copying the identifier from the second header to a reserved space in the first header;

(d) sending the data and the first header from the second protocol layer to the first protocol layer; and

(e) removing the first header from the data at the first protocol layer.

12. (Currently Amended) The method of claim 11, wherein the first protocol layer is the highest protocol layer of the layered sequence of the data communication protocol layers.

13. (Currently Amended) The method of claim 11, wherein the second protocol layer is the lowest protocol layer of the layered sequence of the data communication protocol layers.

14-15. (Canceled)

16. (Currently Amended) A method of assigning an identifier to data processed through ~~one or more~~ a layered sequence of protocol layers ~~used to process data communications between one or more computers over a network~~, each protocol layer having a header, the method comprising:

(a) reserving a space for the identifier in the header added to the data at ~~[[of]]~~ each successive protocol layer;

(b) generating the identifier at one of the protocol layers; and

(c) storing the identifier in the reserved space of one of the protocol layers.

17. (Original) The method of claim 14, wherein reserving a space for the identifier in the header of each protocol layer comprises reserving the first four bytes of the header.

18. (Original) The method of claim 14, wherein the one or more computers comprise a sending computer and a receiving computer; and wherein reserving a

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space for the identifier in the header of each protocol layer comprises reserving a space for the identifier in the header of each protocol layer of the sending computer.

19. (Original) The method of claim 14, wherein generating the identifier at one of the protocol layers comprises generating the identifier at the lowest protocol layer of the sending computer.

20. (Original) The method of claim 14, wherein storing the identifier in the reserved space of each header comprises:

- (a) copying the identifier from the lowest protocol layer in the sending computer to the rest of the protocol layers in the sending computer;
- (b) sending the identifier from the lowest protocol layer in the sending computer over the network to the lowest protocol layer in the receiving computer; and
- (c) copying the identifier from the lowest protocol layer in the receiving computer to the rest of the protocol layers in the receiving computer.

21. (Currently Amended) A computer program for sending data from a first computer to a second computer connected within a network embodied in a tangible computer readable medium, the first and second computers configured to send the data using a layered sequence of data communication protocols ~~the first computer having one or more data communication protocol layers that correspond to one or more data communication protocol layers in the second computer, the one or more protocol layers~~ layered sequence of data communication protocols comprising at least a first protocol layer and a second protocol layer, the computer program comprising:

a code segment for generating a first layer protocol data unit (PDU) by:

- (a) ~~a code segment for attaching a first header to the data at the first protocol layer of the first computer; and~~
- (b) ~~a code segment for reserving a space in the first header for an identifier;~~

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(e) a code segment for sending the first layer PDU data and the first header from the first protocol layer to the second protocol layer of the first computer;
a code segment for generating a second layer PDU by:
 (d) ~~a code segment for repeating steps (a) — (b) for a second header;~~
(a) attaching a second header to the first layer PDU at the second protocol layer of the first computer;
(b) reserving a space in the second header for the identifier;
~~(e) (c) a code segment for generating the identifier at the second protocol layer; and~~
~~(f) (d) a code segment for storing the identifier in the reserved space of the first header and in the reserved space of the second header and~~
sending a copy of the identifier to the first protocol layer;
~~(g) a code segment for sending the data second layer PDU with the first header and the second header from the second protocol layer of the first computer to its the corresponding second protocol layer of the second computer over the network;~~
 (h) a code segment for removing the second header from the second layer PDU data at the second protocol layer of the second computer;
 (i) a code segment for copying the identifier from the reserved space in the second header to the reserved space in the first header;
 (j) a code segment for sending the ~~data and the first header~~ first layer PDU from the second protocol layer of the second computer to the first protocol layer of the second computer; and
 (k) a code segment for removing the first header from the ~~data~~ first layer PDU at the first protocol layer of the second computer.

22. (Currently Amended) A computer program stored on a tangible computer readable medium for sending data from a computer to a network through a layered sequence of one or more data communication protocol layers ~~embedded in a computer program~~, the protocol layers comprising at least a first protocol layer and a second protocol layer, the computer program comprising:
a code segment for generating a first layer protocol data unit (PDU) by:

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- (a) ~~a code segment for attaching a first header to the data at the first protocol layer; and~~
- (b) ~~a code segment for reserving a space in the first header for an identifier;~~
- (e) ~~a code segment for sending the first layer PDU data and the first header from the first protocol layer to the second protocol layer;~~
- (d) ~~a code segment for repeating steps (a) — (b) for a second header;~~
a code segment for generating a second layer PDU by:
 - (a) attaching a second header to the first layer PDU at the second protocol layer;
 - (b) reserving a space in the second header for the identifier;
 - (e) ~~(c)~~ a code segment for generating the identifier at the second protocol layer; and
 - (f) ~~(d)~~ a code segment for storing the identifier in the reserved space of the first header and in the reserved space of the second header and sending a copy of the identifier to the first protocol layer;
- (g) ~~a code segment for sending the data second layer PDU with the first header and the second header from the second protocol layer to the network.~~

23. (Currently Amended) A computer program stored on a tangible computer readable medium for receiving data by a computer from a network ~~embedded in a computer program~~, the computer having a layered sequence of one or more data communication protocol layers, the protocol layers comprising at least a first protocol layer and a second protocol layer, the computer program comprising:

- (a) a code segment for receiving from the network, at the second protocol layer, the data, a first header corresponding to the first protocol layer, and a second header corresponding to the second protocol layer;
- (b) a code segment for removing, at the second protocol layer, the second header from the data, the second header having an identifier;
- (c) a code segment for copying the identifier from the second header to a reserved space in the first header;

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(d) a code segment for sending the data and the first header from the second protocol layer to the first protocol layer; and

(e) a code segment for removing the first header from the data at the first protocol layer.

24. (Currently Amended) A computer program embodied on a tangible computer readable medium for assigning an identifier to data processed through one or more a layered sequence of protocol layers [[of]] used to process data communications between one or more computers over a network ~~embodied in a computer program~~, each protocol layer having a header, the computer program comprising:

(a) a code segment for reserving a space for the identifier in the header added to the data at [[of]] each successive protocol layer;

(b) a code segment for generating the identifier at one of the protocol layers;
and

(c) a code segment for storing the identifier in the reserved space of one of the protocol layers.

25. (Cancelled)

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26. (New). A method of processing data for transmission to a remote computer using a data communications protocol stack that includes a plurality of protocol layers, the method comprising:

beginning with a first protocol layer and for each successively lower layer of the protocol stack:

- (a) attaching a header associated with a current layer of the protocol stack to the data;
- (b) reserving a space in the header for an identifier; and
- (c) sending the data and attached header to the next successive layer

in the protocol stack;

additionally, at a lowest successive layer of the protocol stack:

- (a) generating the identifier; and
- (b) storing the identifier in the reserved space of the lowest successive

layer of the protocol stack; and

- (c) returning a copy of the identifier to a previous layer of the protocol

stack.

27. (New). The method of claim 1, wherein, the identifier is returned to each of the plurality of protocol layers by returning a copy the identifier, successively, from the last protocol layer to each successive protocol layer.

28. (New). The method of claim 26, wherein the data communications protocol stack comprises the TCP/IP protocol stack, and a wherein the plurality of protocol layers include an application, transport, internet, and network layer.

29. (New). The method of claim 26, further comprising,

receiving, by a lowest protocol layer of the protocol stack at the remote computer, the data and headers;

retrieving the identifier from the header associated with the lowest protocol layer;

removing the header associated with the lowest protocol layer from the data;

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transmitting the data and the identifier to the next successively higher layer of the protocol stack.

beginning with the next successively higher layer protocol layer and for each successively higher layer of the protocol stack:

(a) removing a header from the data associated with a current protocol layer;

(b) transmitting the data and the identifier to the next successively higher layer of the protocol stack.